A B S T R A C T

The invention relates to a solid state brachytherapy applicator for performing radiation therapy treatment in an animal body, said applicator at least comprising an X-ray emitting surface composed of: a vacuum cavity containing a cathode and an anode spaced apart at some distance from each other; emitting means for emitting free electrons from the cathode; electric field means for applying during use a high-voltage electric field between said cathode and said anode for accelerating said emitted free electrons towards said anode; wherein said vacuum cavity being at least partly transparent to X-ray radiation emitted by said anode.

The invention furthermore relates to a radiation therapy treatment system for performing radiation therapy treatment in an animal body and to a method for performing radiation therapy treatment in an animal body using a solid state brachytherapy applicator according to the invention.

According to the invention said vacuum cavity is bound by first and second plate-shaped elements spaced some distance from each other, said first plate-shaped element serving as cathode and said second plate-shaped element serving as anode.